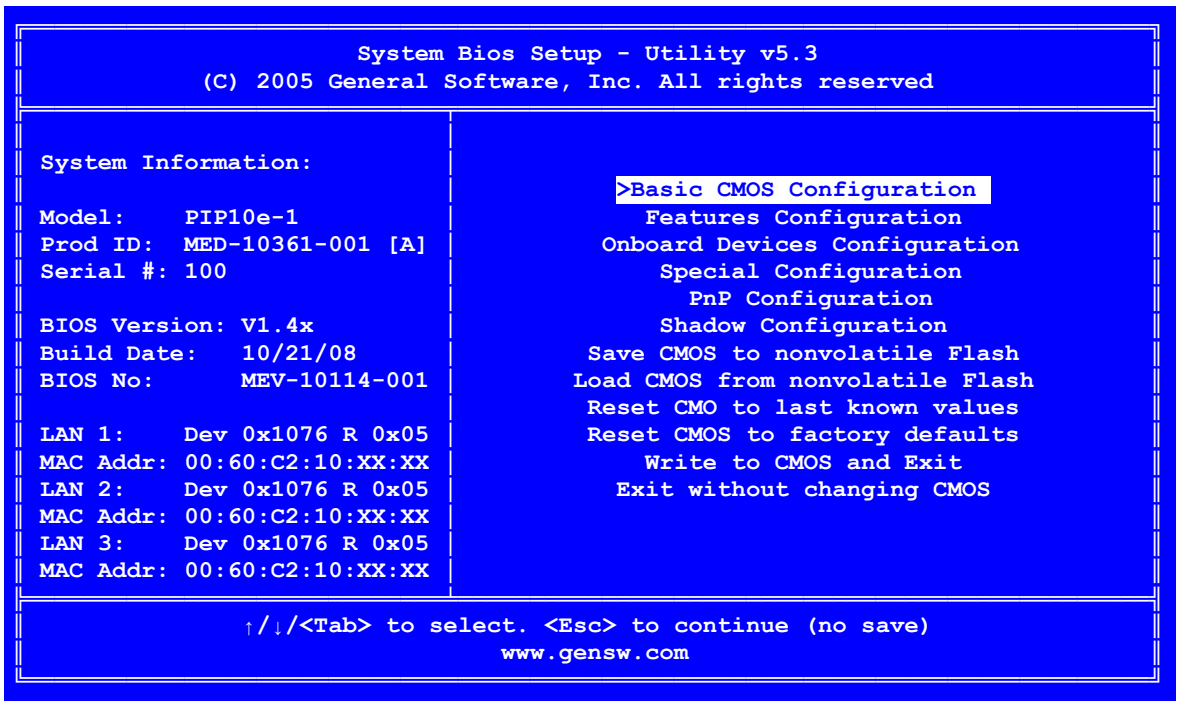
PIP9-1E / PIP10-1E / PIP11-1E BIOS V1.4x



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1 INTRODUCTION

1.1 BIOS FEATURES

The PIP9-1E / PIP10-1E / PIP11-1E BIOS V1.4x supports the following standards and key features:

- ACPI 1.0
- Plug'n'Play
- USB Boot (Floppy disk, CD-ROM, Hard disk)
- USB Legacy Keyboard and Mouse
- PXE Network Boot
- Console Redirection over Serial Port
- MPL UPS-1

1.2 ABOUT THIS MANUAL

This manual provides all the information necessary to configure the PIP9-1E / PIP10-1E / PIP11-1E BIOS V1.4x. The manual is written for technical personnel. It is recommended to use this manual in combination with the PIP9-1E / PIP10-1E / PIP11-1E User Manual.

NOTE
It is strongly recommended to read the PIP9-1E / PIP10-1E / PIP11-1E User Manual, the PIP9-1E / PIP10-1E / PIP11-1E Technical Reference Manual and also this manual before the PIP9-1E / PIP10-1E / PIP11-1E is switched on.

1.3 MANUAL REVISIONS

1.3.1 RELATED PRODUCTS

Manual Revisions	Related To
A	PIP9-1E / PIP10-1E / PIP11-1E BIOS V1.3x
B	PIP9-1E / PIP10-1E / PIP11-1E BIOS V1.4x

1.3.2 REVISION HISTORY

Manual Revisions	Date	Description
A	2007-10-30	Initial release of this document
B	2008-04-30	Reflect BIOS V1.4x features: - PXE: Updated PXE binary (v1.2.70) - PnP nodes for mouse and floppy dynamically - Enhanced support for MWDMA modes and Compact Flash - Setup Screen / POST messages enhancements

1.4 RELATED DOCUMENTATION

The following documents are related to this manual. For detailed Information about a specific PIP9-1E / PIP10-1E / PIP11-1E feature or setting please refer to these additional manuals.

Reference	Description	Available from
[1]	PIP9-1E / PIP10-1E / PIP11-1E User Manual	MPL AG: http://www.mpl.ch/t2440.html
[2]	PIP9-1E / PIP10-1E / PIP11-1E Technical Reference Manual	MPL AG: http://www.mpl.ch/t2440.html

2 HARDWARE CONFIGURATION

2.1 INTERRUPTS (IRQs)

The standard PC AT architecture is limited to 16 Interrupts (IRQs). The following table shows the typical usage of the available interrupt lines on the PIP.
Please consult this table before changing IRQ assignments of devices in the BIOS or adding PC/104 expansion cards in order to avoid conflicts and to make sure that there will be sufficient IRQs available.

The PIP standard configuration uses all but two interrupts (5 and 11). IRQ 12 is also available if the following two conditions are met:

- 'PS/2 Mouse' (refer to section 3.7.7) is set to 'Disabled' or it is set to 'Auto' **and** no PS/2 mouse is connected
- 'UsbHid' (refer to section 3.6.7) is disabled

Additional interrupts can be made available by disabling onboard devices. Onboard devices that can be configured to use different interrupts are marked 'Configurable' in the table below.

IRQ	Usage	Remarks	PIP default configuration
0	System Timer	Not available	
1	Keyboard	Not available	
2	Cascade	Not available	
3	Serial Port 2 / Serial Port 4	Configurable / Available for PC/104	Used
4	Serial Port 1 / Serial Port 3	Configurable / Available for PC/104	Used
5	Not used	Configurable / Available for PC/104	Available
6	Floppy Disk Controller	Available for PC/104	Used
7	Parallel Port	Configurable / Available for PC/104	Used
8	Real Time Clock (RTC)	Not available	
9	PCI Devices	Not available	
10	PCI Devices	Not available	
11	Not used	Configurable / Available for PC/104	Available
12	PS/2 Mouse	Available for PC/104 if PS/2 mouse disabled and UsbHid disabled	
13	Floating Point Unit (FPU)	Not available	
14	Primary ATA Channel	Not available	
15	Secondary ATA Channel	Not available	

For a PC/104 card configuration example, please refer to section 2.4.

2.2 MEMORY

PC/104 (ISA) and PC/104-*Plus* (PCI) add-on cards may require a certain amount of memory for installing their option ROMs or they have onboard memory that needs to be mapped into the system memory space.
The memory area used for this purpose is limited to 000C0000h – 000DFFFFh.

NOTE: This area is 16kB (4000h) granular if used as shadow RAM for option ROMs. This means that although an option ROM may occupy only 2kB (800h), the rest of this 16kB area cannot be used by other devices. This implies that option ROMs always start and end on 16kB boundaries.

The area C0000h – CFFFFh is used by the VGA BIOS and is therefore not available for other devices.
The system BIOS is located at E0000h – FFFFFh (128kB).
The PXE Boot ROM can be disabled in BIOS setup (please refer to 3.8.2) to free up memory ranges which can be used for other purposes. Option ROMs are installed starting at 0D0000h.

Fig. 1 shows the memory map with different configurations of the PXE option ROM included in the system BIOS.

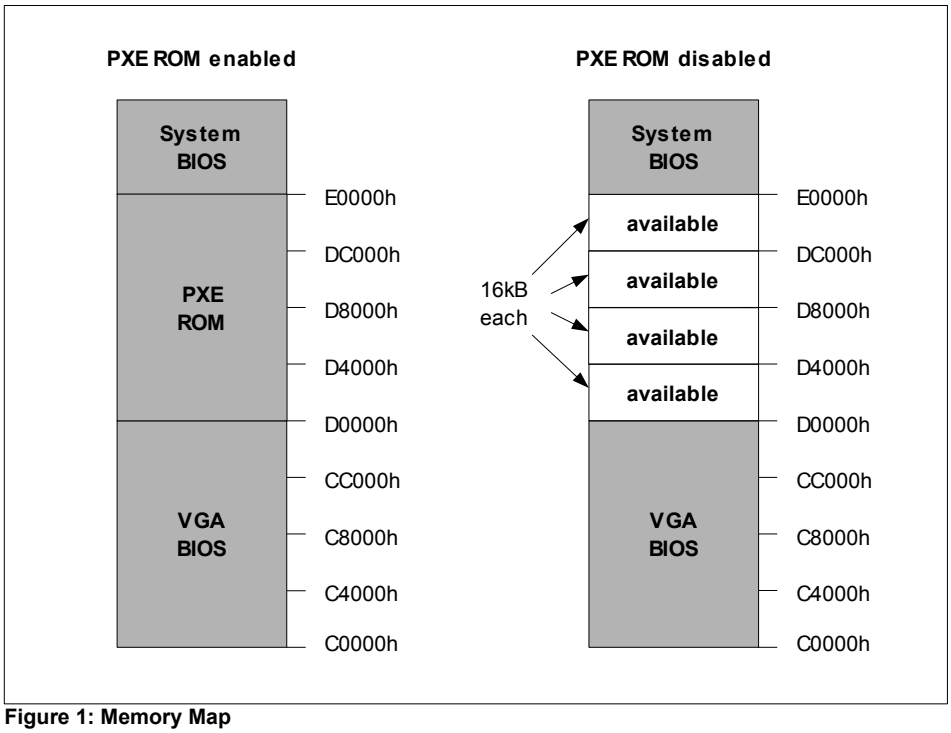

Figure 1: Memory Map

The free ranges in the figure above can be used as ISA memory for PC/104 cards (see section 3.8.4) or for additional option ROMs of add-on cards (see section 3.9).

For a PC/104 card configuration example, please refer to section 2.4.

2.3 I/O

Input/Output space is required by most PC/104 cards. The table below is an overview of the PIP's I/O space usage from 0000h to 03FFh, which is the important range for PC/104 cards.

'Configurable' devices can be set up to use a different I/O range, or can be disabled completely.

I/O range	Usage	Remarks	PIP default configuration
03F8h – 03FFh	Serial port	Configurable	Used
03F7h – 03F7h	Floppy disk controller	Configurable	Used
03F6h – 03F6h	Primary ATA channel	Not available	
03F0h – 03F5h	Floppy disk controller	Configurable	Used
03E8h – 03EFh	Serial port	Configurable	Used
03C0h – 03DFh	VGA	Not available	
03B0h – 03BBh	VGA	Not available	
0378h – 037Fh	Parallel port	Configurable	Used
0376h – 0376h	Secondary ATA channel	Not available	
0338h – 033Fh	Serial port	Configurable	Available
02F8h – 02FFh	Serial port	Configurable	Used
02E8h – 02EFh	Serial port	Configurable	Used
0278h – 027Fh	Parallel port	Configurable	Available
0238h – 023Fh	Serial port	Configurable	Available
0228h – 022Fh	Serial port	Configurable	Available
0220h – 0227h	Serial port	Configurable	Available
01F0h – 01F7h	Primary ATA channel	Not available	
0170h – 0177h	Secondary ATA channel	Not available	
0000h – 00FFh	Various system devices	Not available	

This leads to the following consecutive I/O ranges that can be used by PC/104 cards on a PIP with default configuration:

- 100h – 16Fh
- 180h – 1EFh
- 200h – 2DFh
- 300h – 370h
- 380h – 3AFh

For a PC/104 card configuration example, please refer to section 2.4.

2.4 EXAMPLE CONFIGURATION

The following is an example of how to configure a PC/104 add-on card. These cards commonly require manual configuration and can cause problems if they are not configured properly.

NOTE: PC/104 cards are ISA based, while PC/104-*Plus* cards are PCI based. PC/104-*Plus* cards generally do not require manual configuration.

In this example, a Softing CAN-AC2-104 CAN card (PC/104) is used.

Step 1 – Resources required by PC/104 card

- Check the resource requirements of the add-on card. Refer to the card's User Manual for the requirements. The CAN-AC2-104 board has the following requirements:
  - I/O range: 4 Byte area between 0000h and 03FFh
  - Memory range: 16kByte area between C8000h and F7FFFh
  - IRQ channel: One IRQ

Step 2 – Define card configuration

- Choose a resource configuration that is not conflicting with other system devices or installed cards. After checking with the available resources of the PIP, we chose the following values:
  - I/O range: 240h (check section 2.3 for available I/O ranges)
  - Memory range: DC000h (check section 2.2 for available memory ranges)
  - IRQ channel: 5 (check section 2.1 for available IRQs)

  NOTE: Only the memory range needs to be configured in the BIOS setup! I/O range and interrupt channel do not need to be configured in the BIOS.
- Configure the selected I/O range on the card by setting the DIP switch accordingly. The memory and IRQ configurations for this card are done by software. However, other types of cards may have jumpers or DIP switches for memory and / or IRQ configuration. If so, these must be configured correctly.

Step 3 – Configure BIOS

- **I/O**
  We chose an I/O range that is not used by any other device, therefore no configuration is needed.
- **Memory**
  This card does not have an Option ROM, therefore Shadow memory must be disabled for the configured memory range.
  - Set up 'PC104 Mem Base Addr' and 'PC104 Mem Size' according to the chosen configuration. See section 3.8.4 for further information.
    - PC/104 MEM Base Addr: DC000h
    - PC/104 MEM Length: 16k
  - Disable Shadow Memory for the selected memory range. See section 3.9 for further information.
    - Shadow 16KB ROM at DC00: Disabled
- **IRQ**
  We chose an IRQ that is not used by any other device, therefore no configuration is needed.

Step 4 – Use the card

- The PIP BIOS is now properly configured for the use of the CAN-AC2-104 card. After the installation of all necessary software and/or drivers, the card is operational.

2.5 ATA MASS STORAGE CONFIGURATION

The PIP features two ATA controllers, one Parallel ATA (P-ATA) and one Serial ATA (S-ATA) controller.
They can be used in several different configurations, depending on the number and type of devices that are connected.
The two controllers are individual PCI functions:

P-ATA Controller: Bus 0 / Dev 31 / Fun 1 / Vendor ID 0x8086 / Device ID 0x25A2
S-ATA Controller: Bus 0 / Dev 31 / Fun 2 / Vendor ID 0x8086 / Device ID 0x25A3

The following tables show the possible configurations and the resulting relationship between the BIOS name and the physical ATA ports and channels as well as the controller that is active in the respective mode. The mode can be selected in the 'Special Configuration' menu (see section 3.8.3).

The default mode is Combined Mode, P-ATA primary.

NOTE
The Combined modes use the S-ATA controller which also controls one of the P-ATA connectors.

The BIOS name is used in the 'Basic CMOS Configuration' setup screen (see section 3.5) to configure the ATA drives and boot order.

P-ATA only:

Active Controller		
P-ATA		
BIOS Name	**Physical Interface**	**Channel**
ATA 0	Primary Master	Primary
ATA 1	Primary Slave	
ATA 2	Secondary Master	Secondary
ATA 3	Secondary Slave	

S-ATA only:

Active Controller		
S-ATA		
BIOS Name	**Physical Interface**	**Channel**
ATA 0	SATA Port 0	Primary
	N/A	
ATA 2	SATA Port 1	Secondary
	N/A	

Combined Mode, P-ATA Primary (default):

Active Controller		
S-ATA		
BIOS Name	**Physical Interface**	**Channel**
ATA 0	Primary Master	Primary
ATA 1	Primary Slave	
ATA 2	SATA Port 0	Secondary
ATA 3	SATA Port 1	

Combined Mode, S-ATA Primary:

Active Controller		
S-ATA		
BIOS Name	**Physical Interface**	**Channel**
ATA 0	SATA Port 0	Primary
ATA 1	SATA Port 1	
ATA 2	Secondary Master	Secondary
ATA 3	Secondary Slave	

NOTE
The ATA Mode should NOT be modified after the installation of the operating system. The OS might not boot anymore if the mass storage controller has changed!

2.6 GRAPHICS CONFIGURATION

2.6.1 INTERNAL GRAPHICS CONTROLLER

The integrated graphics controller can be disabled with DIP switch 4 (please refer to the PIP Technical Reference Manual for further information).

SW4-1	Internal Graphics Controller
OFF	Internal Graphics Controller Enabled
ON	Internal Graphics Controller Disabled

2.6.2 FLAT PANEL DISPLAY (LVDS) INTERFACE

The PIP features an internal LVDS connector for a flat panel display.

More information about the LVDS connector can be found in the PIP Technical Reference Manual.

NOTE

All configuration options in this chapter are used for the LVDS port only. If the monitor is connected to the DVI-I port of the PIP and the internal LVDS port is not used, these options should not be modified.

2.6.2.1 DISPLAY TIMINGS

The timings for different flat panel types are set with DIP switch 4 (please refer to the PIP Technical Reference Manual for further information).

NOTE

If a valid panel type is selected, the DVI-I port of the PIP will be disabled and cannot be used in environments that do not have an Intel Graphics driver (e.g. POST, DOS).

In BIOS V1.4x, the following timings are implemented:

SW4-5	SW4-6	SW4-7	SW4-8	Panel type	Resolution	Remarks
ON	ON	ON	ON	1	640 x 480	Single channel, data format 1
OFF	ON	ON	ON	2	800 x 600	Single channel, data format 1
ON	OFF	ON	ON	3	1024 x 768	Single channel, data format 1
OFF	OFF	ON	ON	4	1280 x 1024	Dual channel, data format 1
ON	ON	OFF	ON	5	1366 x 768	Single channel, data format 0
OFF	ON	OFF	ON	6	1920 x 1080	Dual channel, data format 1
ON	OFF	OFF	ON	7	1024 x 768	Single channel, data format 0
OFF	OFF	OFF	ON	8	800 x 600	Single channel, data format 0
ON	ON	ON	OFF	9	(reserved)	Not used – LVDS port disabled
OFF	ON	ON	OFF	10	(reserved)	Not used – LVDS port disabled
ON	OFF	ON	OFF	11	(reserved)	Not used – LVDS port disabled
OFF	OFF	ON	OFF	12	(reserved)	Not used – LVDS port disabled
ON	ON	OFF	OFF	13	(reserved)	Not used – LVDS port disabled
OFF	ON	OFF	OFF	14	(reserved)	Not used – LVDS port disabled
ON	OFF	OFF	OFF	15	(reserved)	Not used – LVDS port disabled
OFF	OFF	OFF	OFF	16	(reserved)	Not used – LVDS port disabled (default)

2.6.2.2 BACKLIGHT INVERTER TYPES

The type of backlight inverter used for the flat panel is set with DIP switch 4 (please refer to the PIP Technical Reference Manual for further information).

This setting defines the voltage range that controls backlight intensity.

WARNING
If the backlight brightness is controlled via the PIP, the backlight inverter type must be configured correctly!
Failure to do so may cause damage to the inverter and/or the panel backlight.

In BIOS V1.4x, the following inverter types are implemented:

SW4-2	SW4-3	SW4-4	Inverter type	Voltage range	Min. brightness	Max. brightness
OFF	OFF	OFF	Type 1	0 Volt – 5 Volt	0 Volt	5 Volt
ON	OFF	OFF	Type 2	5 Volt – 0 Volt	5 Volt	0 Volt
OFF	ON	OFF	Type 3	1.8 Volt – 0 Volt	1.8 Volt	0 Volt
ON	ON	OFF	Type 4	0 Volt – 2 Volt	0 Volt	2 Volt
OFF	OFF	ON	Type 5	(reserved)	not defined	not defined
ON	OFF	ON	Type 6	(reserved)	not defined	not defined
OFF	ON	ON	Type 7	(reserved)	not defined	not defined
ON	ON	ON	Type 8	(reserved)	not defined	not defined

2.6.2.3 BIOS CONFIGURATION

The flat panel related BIOS settings are located in the Special Configuration Menu (refer to section 3.8).

NOTE: These options are only active if a LVDS panel is connected and properly configured via DIP switches. If the monitor is connected to the DVI-I port of the PIP, these options are inactive and do not affect the display output.

2.6.2.3.1 PANEL FITTING

This option controls the fitting of the panel contents.

If the native resolution of a panel does not correspond to the software resolution, the contents is either stretched to fit the native screen resolution or centered, which results in a black frame around the actual screen content.

Panel Fitting is only used in environments without Intel Graphics driver installed (e.g. POST screen, DOS). If an operating system with Intel Graphics driver is started, this setting can be overridden by the driver.

Panel Fitting	Controls panel fitting behavior	
default	All Stretched	Always fit the screen size (default)
	Gfx Stretched	Graphics Modes are stretched to fit the screen
	Text Stretched	Text modes are stretched to fit the screen
	All Centered	Both Graphics and Text modes are centered

2.6.2.3.2 PANEL BACKLIGHT

This option selects whether the LVDS panel backlight brightness is controlled by BIOS setting or by other means (Hardware up/down switches or application software control).

When set to 'HW/App Control', the backlight can be dimmed by connecting UP and DOWN switches / buttons to Panel Dimming connector J34 (please refer to the PIP Technical Reference Manual for further information).

Panel Backlight	Defines backlight brightness control	
	HW/App Control	Brightness controlled by hardware or application
default	BIOS Control	Brightness controlled by BIOS setup

2.6.2.3.3 BRIGHTNESS LEVEL

This option controls the brightness level of the panel backlight, if 'Panel Backlight' is set to 'BIOS Setup'. The brightness can be adjusted in 5% increments.

NOTE: Modifying this option changes the backlight brightness instantly. However, it is still required to write the settings to CMOS when leaving the BIOS setup. Otherwise, the previous brightness setting will be used after leaving the setup.

Brightness Level	Selects brightness level of the backlight, if 'BIOS Control' is selected	
	Minimal	Minimal brightness level
	5%	5% brightness level
	10%	10% brightness level
	...	...
	...	[5% increments]
	...	...
	95%	95% brightness level
default	100%	100% brightness level

3 BIOS

3.1 BIOS UPDATE

The system BIOS of the PIP resides in a FLASH memory. Therefore BIOS upgrading with an additional utility is easily possible.
For BIOS upgrading, download the Windows executable program file from the MPL AG homepage www.mpl.ch. This file creates a bootable floppy disk including all the files necessary to update the BIOS.

1. Download BIOS upgrade file suitable for your PIP.
2. Execute the BIOS upgrade file to create the bootable BIOS upgrade disk.
3. Boot your PIP with the BIOS upgrade disk.
4. Follow the instructions on the screen. You can choose to save the current BIOS version to the disk as a backup in case you want to revert the update.
5. BIOS upgrade starts and informs you of the progress.
6. Power down the system after the BIOS update.

The new BIOS takes control the next time you start up your PIP.

CAUTION
If something fails (e.g., loss of power) during BIOS upgrading (especially after erasing the FLASH memory) and the utility can not terminate properly, the PIP will no longer have a valid BIOS!
In these cases, contact MPL AG to start up the system again.

If your system is not equipped with a floppy drive, use one of the following ways to upgrade the BIOS:

1. External USB floppy drive
The BIOS Upgrade Disk can be booted with an USB floppy drive.

2. CD ROM drive (external USB drive or internal ATA drive)
If your system has a CD ROM drive, the BIOS Upgrade Disk can be used as boot image to create a bootable CD ROM.

3. Hard Disk drive (external USB drive or internal ATA drive)
If your system hard disk contains a DOS partition, you can start the BIOS upgrade from there.
If your system hard disk does not contain a DOS partition, you can temporarily install a different hard drive that boots a DOS. This hard drive can either be connected to one of the P-ATA / S-ATA ports or externally to the USB port.

4. Network (PXE) boot
It is possible to boot the BIOS Upgrade Disk via network. The boot server in the network must be configured to provide an image created from the BIOS Upgrade Disk as boot file.

3.2 BOOT SCREEN

At POST (**P**ower **O**n **S**elf **T**est), various information about the system configuration is displayed.

3.2.1 BIOS RELEASE INDEX

The BIOS release index and CPU information are shown during POST. The CPU signature (06D6) contains family (6), model (D) and stepping (6) information of the installed processor, and the actual CPU speed is displayed as well. This information changes according to the installed processor type.
The PIP type (e.g. PIP10) is displayed along with the BIOS version (V1.4x) and BIOS identification number (MEV-10114-004).

The following figure shows how this information is displayed, with the 1.4GHz Pentium-M CPU as example:

```
MPL PIP10 BIOS V1.4x – Pentium-M (06D6) at 1400MHz
MEV-10114-004
```

Figure 2: BIOS Release Index

3.2.2 PCI DEVICES

At POST, the PCI devices installed in the system are listed. The figure below shows the PCI devices present on the PIP board.

NOTE: All additional PC/104+ and/or PCI devices installed in the system will appear on bus 03 and above.

```
PCI Device Table.
Bus Dev Func VendID DevID Class              Irq
 00  00  00   8086   3580  Host Bridge
 00  00  01   8086   3584  System
 00  00  03   8086   3485  System
 00  02  00   8086   3582  VGA Display        10
 00  02  01   8086   3582  Display
 00  1C  00   8086   25AE  PCI-to-PCI Bridge
 00  1D  00   8086   25A9  Serial Bus         10
 00  1D  01   8086   25AA  Serial Bus         10
 00  1D  04   8086   25AB  System
 00  1D  05   8086   25AC  IRQ Controller
 00  1D  07   8086   25AD  Serial Bus         10
 00  1E  00   8086   244E  PCI-to-PCI Bridge
 00  1F  00   8086   25A1  ISA Bridge
 00  1F  01   8086   25A2  IDE Controller     14
 00  1F  03   8086   25A4  Serial Bus         10
 01  01  00   8086   1076  Ethernet           9
 01  02  00   104C   AC28  PCI-to-PCI Bridge
 02  03  00   8086   1076  Ethernet           9
 02  04  00   8086   1076  Ethernet           9
 03  06  00   100B   0021  ISA Bridge
```

Figure 3: PCI Device Table

3.2.3 MASS STORAGE DEVICES

The following example shows how mass storage devices are listed.

```
CDROM Device(s):
  ATA 2: Pioneer DVD-ROM ATAPIModel D E1.21
ATA Device(s):
  ATA 0: HTS424040M9AT00              MA20A71A        MPA2412Q2GW4T12
  ATA 1: STI Flash Drive              Rev 1.1   STI   0E202022102934
```

Figure 4: Mass Storage Device Table

Each installed ATA device is listed with device location (1st column), device name (2nd column), firmware revision (3rd column) and model no. (4th column).
For more information about the drive location, please refer to section 2.5.

The table is divided into **CDROM Device(s)** and **ATA Device(s)**.
CDROM devices are optical devices such as CD-ROM drives, DVD drives etc. Additionally, if the BIOS is configured to boot from a CD-ROM drive, a message indicating the search for a bootable image on the disk appears, as follows:

```
CDROM Device(s):
  ATA 2: Pioneer DVD-ROM ATAPIModel D E1.21

  Searching for El Torito Bootable Image... Found a bootable image.
```

Figure 5: CDROM Device Table

NOTE: The 'Searching for El Torito Bootable Image' message appears also with USB CD-ROM drives. However, they are not listed in the device table. The table lists only ATA devices.

3.3 ENTERING BIOS SETUP

The BIOS Setup is entered by pressing the <DEL> key at POST, indicated by the following message:

```
Hit <Del> if you want to run SETUP.
```

Figure 6: Enter Setup Message

If the console is being redirected, the key combination <CTRL>+<C> must be sent from the serial terminal program for entering the BIOS Setup. Please refer to section 3.6.6 for more information about Console Redirection.

3.4 MAIN BIOS SETUP SCREEN

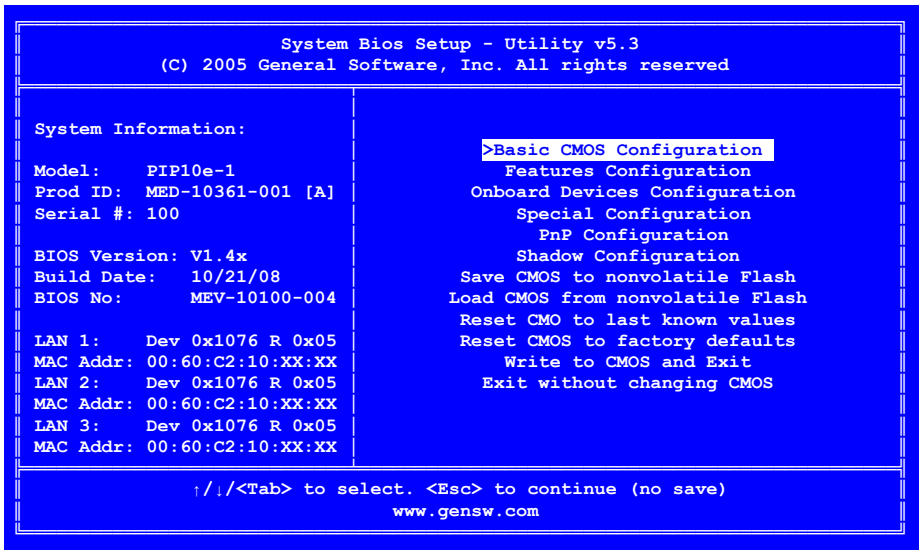

Figure 7: Main BIOS Setup Screen

3.4.1 SYSTEM INFORMATION

The left side of the main setup screen displays detailed information about the system.

3.4.1.1 MODEL

This shows what PIP PCB model is mounted in the system.

3.4.1.2 PROD ID

This is the product number of the PIP PCB.

3.4.1.3 SERIAL

This is the serial number of the PIP PCB.

3.4.1.4 BIOS VERSION

This reflects the BIOS version which is installed on the PIP.

3.4.1.5 BUILD DATE

This is the build date of the installed BIOS version.

3.4.1.6 BIOS NO

This is the product number of the installed BIOS version.

3.4.1.7 LAN 1-3

These are the device IDs and revisions of the onboard Ethernet controllers.

3.4.1.8 MAC ADDR

The unique Media Access Control address of the respective Ethernet controller (LAN 1-3) is displayed here. The MAC address is six bytes long and the first three bytes are always `00:60:C2` for MPL products. The last three bytes are different on every PIP.

3.4.2 MAIN SETUP MENU

The right side of the main setup screen contains the menu used to navigate through the BIOS setup options. The menu entries will be discussed in detail below.

3.4.2.1 SAVE CMOS TO NONVOLATILE FLASH

This feature writes the current BIOS settings to the Flash. Please refer to section 4 for detailed information about nonvolatile BIOS setup.

3.4.2.2 LOAD CMOS FROM NONVOLATILE FLASH

Use this feature to manually read the BIOS settings from the Flash. Please refer to section 4 for detailed information about nonvolatile BIOS setup.

3.4.2.3 RESET CMOS TO LAST KNOWN VALUES

This option discards changes made during this BIOS Setup session by reloading the values from the CMOS RAM.

3.4.2.4 RESET CMOS TO FACTORY DEFAULTS

This option resets the BIOS settings to their default values.

3.4.2.5 WRITE TO CMOS AND EXIT

This option is used leave the BIOS setup and write the current BIOS settings to the CMOS RAM. The system will reboot automatically.

3.4.2.6 EXIT WITHOUT CHANGING CMOS

Use this option to leave the BIOS setup without saving the settings to CMOS RAM.

3.5 BASIC CMOS CONFIGURATION

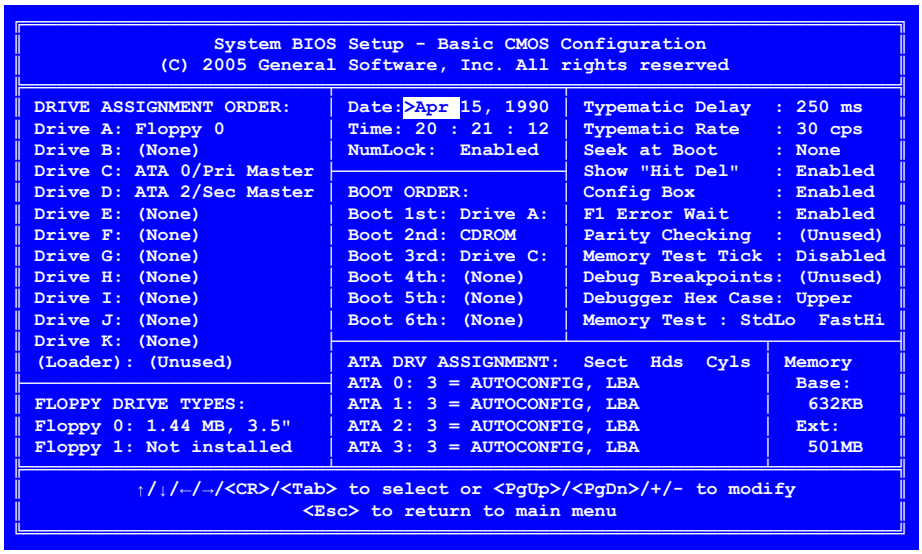

Figure 8: Basic CMOS Configuration Screen

3.5.1 DRIVE ASSIGNMENT ORDER

This field lets you configure the drive assignment. Take care that the first floppy drive is assigned to 'Drive A' and the first hard disk drive to 'Drive C'.
The following table shows the possible settings for drives A: through K: . Please note that only drive A: and B: are selectable to be floppy drives.
In order to avoid unnecessary searching for devices during boot up, only drives that are actually connected to the system should be selected here.

Drive Assignment Order		
None	No assignment	
Floppy 0	First floppy drive	
Floppy 1	Second floppy drive	
USB Floppy	USB floppy drive	
ATA 0/Pri Master	ATA 0 (Primary Master)	Please refer to section 2.5 for more information about ATA Mass Storage Configuration
ATA 1/Pri Slave	ATA 1 (Primary Slave)	
ATA 2/Sec Master	ATA 2 (Secondary Master)	
ATA 3/Sec Slave	ATA 3 (Secondary Slave)	
USB Hard Drive	USB hard drive	

3.5.2 FLOPPY DRIVE TYPES

Two floppy drives can be used (Floppy 0, Floppy 1), and this option selects the type of each drive.

Floppy Drive Types	
Not installed	No assignment
720 KB, 3.5”	720 Kbyte, 3.5 inch floppy drive
1.44 MB, 3.5”	1.44 Mbyte, 3.5 inch floppy drive
2.88 MB, 3.5”	2.88 Mbyte, 3.5 inch floppy drive
360 KB, 5.25”	360 Kbyte, 5.25 inch floppy drive
1.2 MB, 5.25”	1.2 Mbyte, 5.25 inch floppy drive

3.5.3 BOOT ORDER

This table determines the boot order of the system drives. Set the drive letters according to the assignments made in the drive assignment order table, e.g. 'Drive A:' is equal to 'Drive A:' in the drive assignment order table. To boot from a bootable CD-ROM media, choose 'CDROM', not the drive letter of the CD-ROM drive. Also make sure that 'ATA DRIVE ASSIGNMENT' is set to 'ATA CDROM' if the drive is connected via ATA.
If the CD-ROM drive is connected via USB, choosing 'CDROM' is sufficient. For more information about booting from USB CD-ROM drives, please refer to section 5.

Boot Order	
Boot 1st	First boot device (defaults to 'A:')
Boot 2nd	Second boot device (defaults to 'CDROM')
Boot 3rd	Third boot device (defaults to 'C:')
Boot 4th	Fourth boot device (defaults to 'None')
Boot 5th	Fifth boot device (defaults to 'None')
Boot 6th	Sixth boot device (defaults to 'None')

3.5.4 ATA DRIVE ASSIGNMENT

This selects the installed drive type for each of the four possible ATA connections. Please refer to section 2.5 for more information about ATA Mass Storage Configuration.

ATA Drv Assignment	
Not installed	No drive installed
User Type	The 'USER TYPE' allows to select the maximum cylinders, heads and sectors per track associated with the connected IDE drive.
Autoconfig, Physical	The 'PHYSICAL' type instructs the BIOS to query the drive's geometry from the controller on each POST. This setting is limited to drives of 512 MB or less.
Autoconfig, LBA	The 'LBA' type instructs the BIOS to query the drive's geometry from the controller on each POST but then translate the geometry according to the LBA standard. **Use this setting for all new drives**. This setting may also be used with a CD-ROM drive if booting from CD-ROM is not needed.
Autoconfig, CHS	The 'CHS' type instructs the BIOS to query the drive's geometry from the controller on each POST but then translate the geometry according to the Phoenix CHS convention.
ATA CDROM	The 'ATA CDROM' type indicates the drive is a CD-ROM drive, not a hard disk. It forces the BIOS to search for a bootable CD-ROM media during POST. To save POST time if booting from CD-ROM is not needed, use 'AUTOCONFIG, LBA' instead.

3.5.5 GENERAL SETTINGS

General Settings		
Typematic Delay	Delay from pressing and holding a key on the keyboard until the start of character repeating	
Typematic Rate	Character repetition rate (characters per second; cps)	
Seek at Boot	None	Default
	Floppy	Seek for floppy
	IDE	(obsolete)
	Both	(obsolete)
Show “Hit DEL”	Enabled	Show at startup the string 'Hit Del to enter the system BIOS' (default)
	Disabled	Do not show the string 'Hit Del to enter the system BIOS'
Config Box	Enabled	Show the configuration box at startup (default)
	Disabled	Don’t show the configuration box
F1 Error Wait	Enabled	Wait for F1 key press if an error is encountered at POST (default)
	Disabled	Do not wait for F1 key press
Parity Checking	(Unused)	This option is not used
Memory Test Tick	Enabled	Click speaker during memory test (default)
	Disabled	Don’t click speaker during memory test
Debug Breakpoint	(Unused)	Not used
Debugger Hex Case	Upper	Not used
	Lower	
Memory Test	Specifies what type of memory test to perform at POST. Can be selected independently for low (below 1 Mbyte) and high (above 1 Mbyte) memory.	
	Fast	Performs a fast memory test (reduces POST time)
	Std	Performs a standard memory test (default)
	Full	Performs an exhaustive memory test (increases POST time)

3.6 FEATURES CONFIGURATION

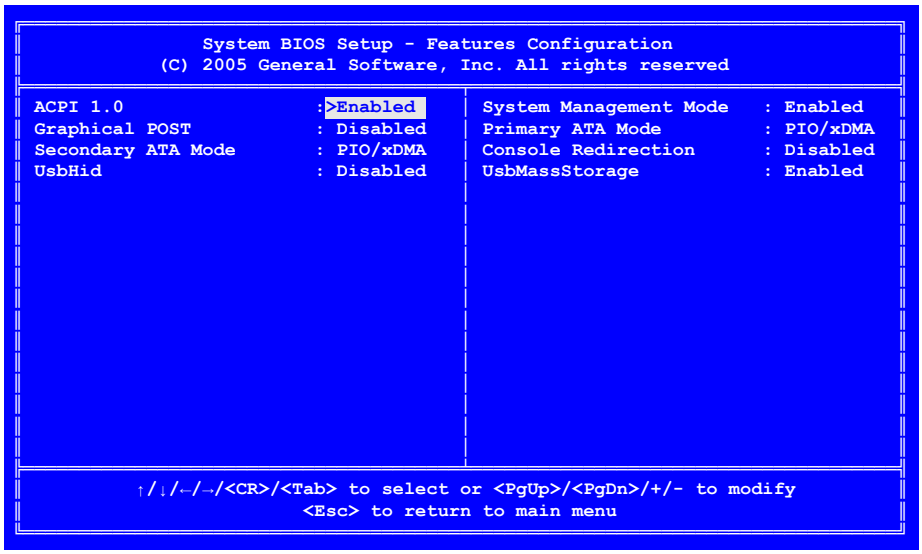
System BIOS Setup - Features Configuration
(C) 2005 General Software, Inc. All rights reserved
ACPI 1.0 :>Enabled
Graphical POST : Disabled
Secondary ATA Mode : PIO/xDMA
UsbHid : Disabled
System Management Mode : Enabled
Primary ATA Mode : PIO/xDMA
Console Redirection : Disabled
UsbMassStorage : Enabled
↑/↓/←/→/<CR>/<Tab> to select or <PgUp>/<PgDn>/+/- to modify
<Esc> to return to main menu

Figure 9: Features Configuration Screen

3.6.1 ACPI 1.0

This option enables or disables support for ACPI V1.0. Enabling this option introduces power saving features such as Hibernate Mode and Soft Off functionality, if the operating system supports ACPI.
This feature must be enabled if MPL UPS-1 is installed in the system.

NOTE: This setting should not be changed once the operating system is installed. Unexpected system behavior could be the result.

ACPI 1.0		
	Disabled	Disable ACPI 1.0
default	Enabled	Enable ACPI 1.0

3.6.2 SYSTEM MANAGEMENT MODE

This option enables or disables System Management Mode (SMM). SMM is a CPU mode transparent to the foreground OS.
There are several tasks that are running in SMM. This includes the following BIOS features which are only available if SMM is enabled:

- USB Mass Storage Support
- USB Legacy Keyboard/Mouse Support
- Some VGA functions (DVI transmitter, LVDS)

Therefore, it is strongly recommended to leave this setting at its default (Enabled).

NOTE: Due to its nature, the SMM may cause problems if the application requires hard real time capabilities. The setup options UsbHid (refer to section 3.6.7) and UsbMassStorage (refer to section 3.6.8) are provided to individually disable SMM features in case of problems.

System Management Mode		
	Disabled	Disable System Management Mode
default	Enabled	Enable System Management Mode

3.6.3 GRAPHICAL POST

This option lets the system boot with a graphical splash screen instead of the standard, text-based POST (Power On Self Test) progress indicator.

Graphical POST		
default	Disabled	Show text information at POST
	Enabled	Show splash screen at POST

3.6.4 PRIMARY ATA MODE

This option controls the transfer mode of the primary ATA channel.

If set to 'PIO/xDMA', the ATA devices connected to the primary ATA channel are configured for their fastest transfer mode possible, including Programmed IO (PIO), Multi-word DMA (MWDMA) and Ultra DMA (UDMA) modes, depending on the device's capabilities.

If set to 'PIO Only', the ATA devices run in PIO mode only. This should only be selected if a device does not work properly with 'PIO/xDMA'.

NOTE: Which physical channel is Primary depends on the selected Mass Storage Mode. Please refer to section 2.5 for further information.

Primary ATA Mode		
default	PIO/xDMA	Use fastest transfer mode possible for Primary ATA channel
	PIO Only	Use only PIO mode for Primary ATA channel

3.6.5 SECONDARY ATA MODE

This option controls the transfer mode of the secondary ATA channel.

If set to 'PIO/xDMA', the ATA devices connected to the secondary ATA channel are configured for their fastest transfer mode possible, including Programmed IO (PIO), Multi-word DMA (MWDMA) and Ultra DMA (UDMA) modes, depending on the device's capabilities.

If set to 'PIO Only', the ATA devices run in PIO mode only. This should only be selected if a device does not work properly with 'PIO/xDMA'.

NOTE: Which physical channel is Secondary depends on the selected Mass Storage Mode. Please refer to section 2.5 for further information.

Secondary ATA Mode		
default	PIO/xDMA	Use fastest transfer mode possible for Secondary ATA channel
	PIO Only	Use only PIO mode for Secondary ATA channel

3.6.6 CONSOLE REDIRECTION

This option controls console redirection. Standard behavior is local display / keyboard.

When set to 'Enabled', console output is routed to Serial Port 1 @ 9600bps, 8N1. There will be no boot messages on the standard display.

Console Redirection		
default	Disabled	Console not redirected
	Enabled	Console redirected to Serial Port 1

3.6.7 USB HID

This option enables USB HID (Human Interface Device) support for legacy environments, such as DOS. Supported devices are keyboards and mice.

This feature requires System Management Mode enabled. If System Management Mode is disabled, UsbHid will be disabled as well. Please refer to section 3.6.7 for more information about SMM.

NOTE: If UsbHid is enabled, IRQ12 will be no longer available for PC/104 devices, even if no PS/2 mouse is connected. Please refer to section 2.1 for more information about Interrupt usage.

UsbHid		
default	Disabled	Legacy Human Interface Device support disabled
	Enabled	Legacy Human Interface Device support enabled

3.6.8 USB MASS STORAGE

This option controls USB Mass Storage support for legacy environments and for the purpose of booting from USB devices. Please refer to section 5 for more information about USB Boot.

This feature requires System Management Mode enabled. If System Management Mode is disabled, UsbMassStorage will be disabled as well. Please refer to section 3.6.2 for more information about SMM.

NOTE: This feature needs to be enabled if the system is configured to boot from USB devices.

UsbMassStorage		
	Disabled	USB Mass Storage Device support disabled
default	Enabled	USB Mass Storage Device support enabled

3.7 ONBOARD DEVICES CONFIGURATION

The Onboard Devices Configuration setup contains options that may not be available on specific versions of the PIP. If so, the particular option is grayed out and cannot be configured.

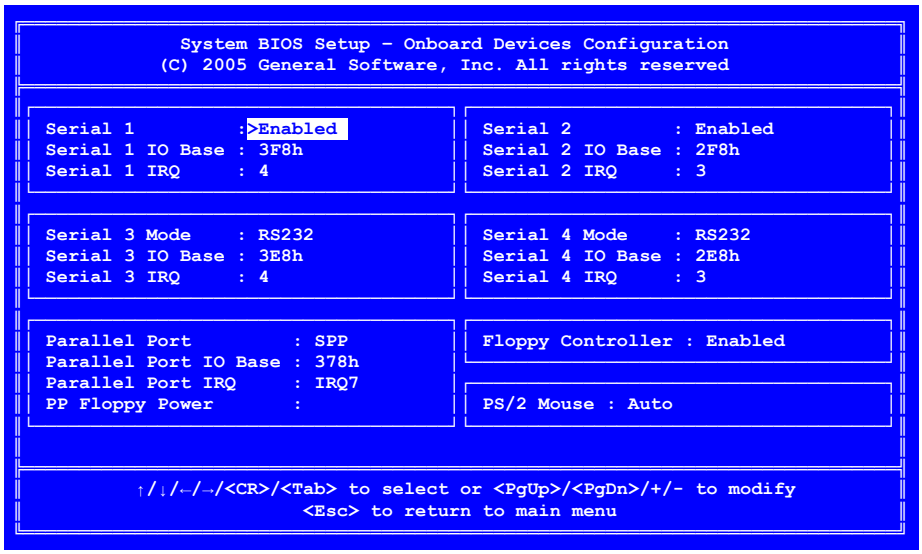
System BIOS Setup – Onboard Devices Configuration
(C) 2005 General Software, Inc. All rights reserved
Serial 1 :>Enabled
Serial 1 IO Base : 3F8h
Serial 1 IRQ : 4
Serial 2 : Enabled
Serial 2 IO Base : 2F8h
Serial 2 IRQ : 3
Serial 3 Mode : RS232
Serial 3 IO Base : 3E8h
Serial 3 IRQ : 4
Serial 4 Mode : RS232
Serial 4 IO Base : 2E8h
Serial 4 IRQ : 3
Parallel Port : SPP
Parallel Port IO Base : 378h
Parallel Port IRQ : IRQ7
PP Floppy Power :
Floppy Controller : Enabled
PS/2 Mouse : Auto
↑/↓/←/→/<CR>/<Tab> to select or <PgUp>/<PgDn>/+/- to modify
<Esc> to return to main menu

Figure 10: Onboard Devices Configuration Screen

3.7.1 SERIAL PORT 1 SETTINGS

Serial Port 1	Enables / Disables Serial Port 1	
	Disabled	Serial Port 1 is disabled. The Serial Port 1 options described below become hidden.
default	RS232	Serial Port 1 is enabled (RS232 mode)
Serial Port 1 IO Base	Selects Serial Port 1 I/O base address	
default	03F8h	Use I/O base address 03F8h
	02F8h	Use I/O base address 02F8h
	03E8h	Use I/O base address 03E8h
	02E8h	Use I/O base address 02E8h
	0220h	Use I/O base address 0220h
	0228h	Use I/O base address 0228h
	0238h	Use I/O base address 0238h
	0338h	Use I/O base address 0338h
Serial Port 1 IRQ	Selects Serial Port 1 IRQ	
	3	Use IRQ 3
default	4	Use IRQ 4 (default: shared[1] with Serial Port 3)
	5	Use IRQ 5
	7	Use IRQ 7
	11	Use IRQ 11

1 *Some operating systems are not capable of sharing interrupts between two serial ports. In such cases, select a unique interrupt for each serial port, e.g. COM1 = IRQ4, COM3 = IRQ11.*

3.7.2 SERIAL PORT 2 SETTINGS

Serial Port 2	Selects Serial Port 2 mode	
	Disabled	Serial Port 2 is disabled. The Serial Port 2 options described below become hidden.
default	RS232	RS232 mode (requires SERIF-1 module)
	RS485 Half Duplex	RS485 half–duplex mode (requires SERIF-2 module)
	RS485 Full Duplex	RS485 / RS422 full-duplex mode (requires SERIF-2 module)
Serial Port 2 IO Base	Selects Serial Port 2 I/O base address	
	03F8h	Use I/O base address 03F8h
default	02F8h	Use I/O base address 02F8h
	03E8h	Use I/O base address 03E8h
	02E8h	Use I/O base address 02E8h
Serial Port 2 IRQ	Selects Serial Port 2 IRQ	
default	3	Use IRQ 3 (default: shared[2] with Serial Port 4)
	4	Use IRQ 4
	5	Use IRQ 5
	7	Use IRQ 7
	11	Use IRQ 11

NOTE: Serial Port 2 can only be used if a SERIF module is present.

3.7.3 SERIAL PORT 3 SETTINGS

Serial Port 3	Enables / Disables Serial Port 3	
	Disabled	Serial Port 3 is disabled. The Serial Port 3 options described below become hidden.
default	RS232	Serial Port 3 is enabled (RS232 mode)
Serial Port 3 IO Base	Selects Serial Port 3 I/O base address	
	03F8h	Use I/O base address 03F8h
	02F8h	Use I/O base address 02F8h
default	03E8h	Use I/O base address 03E8h
	02E8h	Use I/O base address 02E8h
	0220h	Use I/O base address 0220h
	0228h	Use I/O base address 0228h
	0238h	Use I/O base address 0238h
	0338h	Use I/O base address 0338h
Serial Port 3 IRQ	Selects Serial Port 3 IRQ	
	3	Use IRQ 3
default	4	Use IRQ 4 (default: shared[3] with Serial Port 1)
	5	Use IRQ 5
	7	Use IRQ 7
	11	Use IRQ 11

2 *Some operating systems are not capable of sharing interrupts between two serial ports. In such cases, select a unique interrupt for each serial port, e.g. COM2 = IRQ3, COM4 = IRQ5.*

3 *Some operating systems are not capable of sharing interrupts between two serial ports. In such cases, select a unique interrupt for each serial port, e.g. COM1 = IRQ4, COM3 = IRQ11.*

3.7.4 SERIAL PORT 4 SETTINGS

Serial Port 4	Selects Serial Port 4 mode	
	Disabled	Serial Port 4 is disabled. The Serial Port 4 options described below become hidden.
default	RS232	RS232 mode (requires SERIF-1 module)
	RS485 Half Duplex	RS485 half–duplex mode (requires SERIF-2 module)
	RS485 Full Duplex	RS485 / RS422 full-duplex mode (requires SERIF-2 module)
Serial Port 4 IO Base	Selects Serial Port 4 I/O base address	
	03F8h	Use I/O base address 03F8h
	02F8h	Use I/O base address 02F8h
	03E8h	Use I/O base address 03E8h
default	02E8h	Use I/O base address 02E8h
Serial Port 4 IRQ	Selects Serial Port 4 IRQ	
default	3	Use IRQ 3 (default: shared[4] with Serial Port 2)
	4	Use IRQ 4
	5	Use IRQ 5
	7	Use IRQ 7
	11	Use IRQ 11

NOTE: Serial Port 4 can only be used if a SERIF module is present.

3.7.5 PARALLEL PORT SETTINGS

Parallel Port	Selects Parallel Port mode	
	Disabled	Parallel Port is disabled. The Parallel Port options described below become hidden.
default	SPP	Standard bidirectional mode
	Printer	Printer mode
	SPP / EPP 1.7	SPP and EPP 1.7 mode
	SPP / EPP 1.9	SPP and EPP 1.9 mode
	ECP	ECP mode
	ECP / EPP 1.7	ECP and EPP 1.7 mode
	ECP / EPP 1.9	ECP and EPP 1.9 mode
	PP Floppy	The parallel port connector uses 'Floppy Disk Mode' pin configuration (refer to PIP User Manual). If 'PP Floppy' mode is selected, the floppy disk drive signals are redirected to the parallel port connector so that an external floppy disk drive can be connected. The original parallel port functionality is not available any more. Also an internally connected floppy drive does not work as long as 'PP Floppy' mode is selected.
Parallel Port IO Base	Selects Parallel Port I/O base address	
default	0378h	Use I/O base address 0378h
	0278h	Use I/O base address 0278h
Parallel Port IRQ	Selects Parallel Port IRQ	
	3	Use IRQ 3
	4	Use IRQ 4
	5	Use IRQ 5
default	7	Use IRQ 7
	11	Use IRQ 11
PP Floppy Power	Enables / disables power for a parallel port floppy	
default	Disabled	
	Enabled	Provide +5V on pin 25. Can only be enabled if Parallel Port mode is 'PP Floppy'.

4 *Some operating systems are not capable of sharing interrupts between two serial ports. In such cases, select a unique interrupt for each serial port, e.g. COM2 = IRQ3, COM4 = IRQ5.*

3.7.6 FLOPPY CONTROLLER SETTINGS

This option controls the Floppy Controller.

NOTE: If a parallel port floppy is used, this option needs to be enabled also.

Floppy Controller	Enables / disables the Floppy Controller	
	Disabled	Floppy Controller is disabled
default	Enabled	Floppy Controller is enabled

3.7.7 PS/2 MOUSE SETTINGS

This option controls the PS/2 Mouse port.

It can be used to free IRQ12 for usage by a PC/104 card if there is no PS/2 mouse in the system. Please refer to section 2.1 for more information.

NOTE: This option can be helpful if the mouse is not detected properly with the 'Auto' setting, e.g. when a KVM (Keyboard, Video, Mouse) switch is used. In this case, it should be set to 'Enabled' to override auto detection.

PS/2 Mouse	Controls PS/2 Mouse port	
	Disabled	PS/2 Mouse port is disabled. Pointing devices connected to this port do not work. IRQ12 is free.
default	Auto	PS/2 Mouse port is automatically enabled if a pointing device is detected (IRQ12 is used). The mouse port is disabled if no pointing device is detected (IRQ12 is free).
	Enabled	PS/2 Mouse port is always enabled. IRQ12 is used.

3.8 SPECIAL CONFIGURATION

The Special Configuration setup contains options that may not be available on specific versions of the PIP. If so, the particular option is grayed out and cannot be configured.

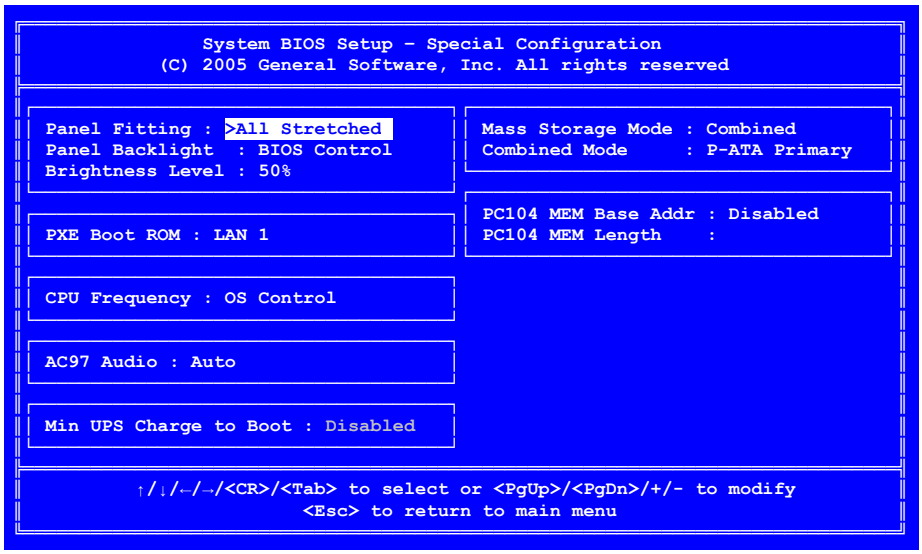
System BIOS Setup – Special Configuration
(C) 2005 General Software, Inc. All rights reserved
Panel Fitting : >All Stretched
Panel Backlight : BIOS Control
Brightness Level : 50%
Mass Storage Mode : Combined
Combined Mode : P-ATA Primary
PXE Boot ROM : LAN 1
PC104 MEM Base Addr : Disabled
PC104 MEM Length :
CPU Frequency : OS Control
AC97 Audio : Auto
Min UPS Charge to Boot : Disabled
↑/↓/←/→/<CR>/<Tab> to select or <PgUp>/<PgDn>/+/- to modify
<Esc> to return to main menu

Figure 11: Special Configuration Screen

3.8.1 LVDS PANEL SETTINGS

These options control panels connected to the PIP via LVDS interface.
Please refer to section 2.6.2 for detailed information about the Flat Panel (LVDS) interface of the PIP.

NOTE: These options are only active if a LVDS panel is connected and properly configured via DIP switches. If the monitor is connected to the DVI-I port of the PIP, these options are inactive and do not affect the display output.

3.8.1.1 PANEL FITTING

This option controls the fitting of the panel contents.
If the native resolution of a panel does not correspond to the software resolution, the contents is either stretched to fit the native screen resolution or centered, which results in a black frame around the actual screen content.

Panel Fitting	Controls panel fitting behavior	
default	All Stretched	Always fit the screen size (default)
	Gfx Stretched	Graphics Modes are stretched to fit the screen
	Text Stretched	Text modes are stretched to fit the screen
	All Centered	Both Graphics and Text modes are centered

3.8.1.2 PANEL BACKLIGHT

This option defines how the backlight brightness level is controlled. If set to 'BIOS Control', the brightness can be adjusted with the option 'Brightness Level'.

Panel Backlight	Defines backlight brightness control	
	HW/App Control	Brightness controlled by hardware or application
default	BIOS Control	Brightness controlled by BIOS setup

3.8.1.3 BRIGHTNESS LEVEL

If 'Panel Backlight' is set to 'BIOS Control', the backlight brightness can be adjusted in 5% increments.

NOTE: Modifying this option changes the backlight brightness instantly. However, it is still required to write the settings to CMOS when leaving the BIOS setup. Otherwise, the previous brightness setting will be used after leaving the setup.

Brightness Level	Selects brightness level of the backlight, if 'BIOS Control' is selected	
	Minimal	Minimal brightness level
	5%	5% brightness level
	10%	10% brightness level
	...	...
	...	[5% increments]
	...	...
	95%	95% brightness level
default	100%	100% brightness level

3.8.2 PXE BOOT ROM

This option enables / disables the integrated PXE Boot ROM which allows the system to boot from Ethernet (please refer to section 6 for detailed information). It defines which one of the onboard Ethernet controllers can be used to boot from network.

Disabling this ROM frees memory in the D segment which can be used for other option ROMs or devices that use memory in this range. Please refer to section 2.2 for more details about the memory map.

PXE Boot ROM	Enables / disables Network Boot	
	Disabled	PXE Boot ROM is disabled
default	LAN 1	PXE Boot ROM is enabled for LAN 1
	LAN 2	PXE Boot ROM is enabled for LAN 2
	LAN 3	PXE Boot ROM is enabled for LAN 3

3.8.3 MASS STORAGE

This option configures the integrated ATA controllers.

Please refer to section 2.5 for more detailed information about the modes.

Mass Storage Mode	Selects the Mass Storage Mode	
	P-ATA Only	Use Parallel ATA only
	S-ATA Only	Use Serial ATA only
default	Combined	Use Serial ATA and one Parallel ATA channel
Combined Mode	Selects the primary channel for Combined Mode	
default	P-ATA Primary	Parallel ATA channel is primary channel Serial ATA ports are secondary channel
	S-ATA Primary	Serial ATA ports are primary channel Parallel ATA channel is secondary channel

3.8.4 PC104 MEM BASE

This option reserves memory space for legacy ISA (PC/104) cards.

NOTE: C and D segments are also the space where option ROMs such as the integrated PXE ROM are loaded. Routing this memory space to PC/104 can result in loss of Option ROM functionality. Please refer to section 2.2 for further details about the default memory layout of the PIP.

PC104 MEM Base Addr	Defines the base address of the memory range to be routed to PC/104	
default	Disabled	Memory window disabled. The MEM length option described below becomes hidden.
	D000	Memory window starting at D0000h
	D400	Memory window starting at D4000h
	D800	Memory window starting at D8000h
	DC00	Memory window starting at DC000h
PC104 MEM Length	Defines the size of the memory range	
default	8k	Memory window size 8 k (2000h)
	16k	Memory window size 16 k (4000h)
	32k	Memory window size 32 k (8000h)
	64k	Memory window size 64 k (10000h)

3.8.5 CPU FREQUENCY

This option controls the CPU frequency.

The Pentium-M processor of the PIP supports Enhanced Intel SpeedStep® Technology.

To use the SpeedStep feature, the operating system must support it natively (e.g. Windows XP, Windows Server 2003, Linux).

NOTE: Depending on the installed CPU type, the configurable frequency values as well as the availability of the SpeedStep® feature may vary.

CPU Frequency	Controls the CPU speed	
default	OS Control	CPU speed is controlled natively by the operating system. Requires that 'ACPI 1.0' feature (see section 3.6.1) is enabled.
	600MHz	CPU runs fixed @ 600MHz without SpeedStep
	1400MHz	CPU runs fixed @ 1400MHz without SpeedStep

3.8.6 AC97 AUDIO SETTINGS

This option controls the onboard AC'97 audio device.

NOTE: This option is only useful if the MPL SoundPAN-1 option is installed.

AC97 Audio	Controls AC'97 audio device	
default	Auto	AC'97 audio device is enabled automatically if the MPL SoundPAN-1 option is installed. If SoundPAN-1 is not present, the AC'97 device is disabled.
	Disabled	Manually disable AC'97 audio device.

3.8.7 MIN UPS CHARGE TO BOOT

If MPL UPS-1 is present in the system, this option configures the required UPS battery charge level for operating system boot. If enabled, the start of the installed operating system is delayed until the UPS battery has reached the configured charge level.
If no UPS-1 was detected, the option is disabled and not adjustable.

Min UPS Charge to Boot	Defines the minimal UPS battery level required to boot the system	
	Disabled	The system does not check for minimum battery charge level. It always boots. (Not recommended)
default	20%	The system boots the OS after the battery charge level has reached 20%.
	40%	The system boots the OS after the battery charge level has reached 40%.
	60%	The system boots the OS after the battery charge level has reached 60%.

3.9 SHADOW RAM CONFIGURATION

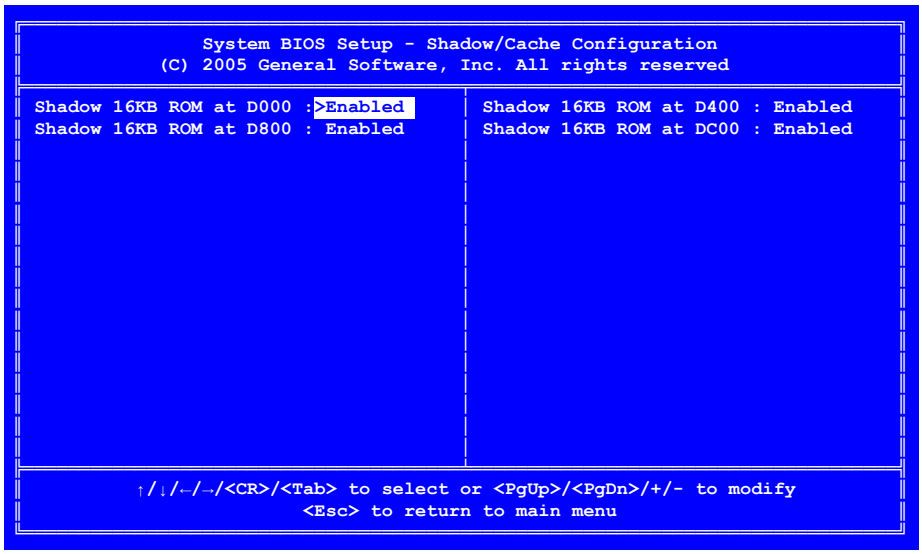
System BIOS Setup - Shadow/Cache Configuration
(C) 2005 General Software, Inc. All rights reserved
Shadow 16KB ROM at D000 :>Enabled
Shadow 16KB ROM at D800 : Enabled
Shadow 16KB ROM at D400 : Enabled
Shadow 16KB ROM at DC00 : Enabled
↑/↓/←/→/<CR>/<Tab> to select or <PgUp>/<PgDn>/+/- to modify
<Esc> to return to main menu

Figure 12: Shadow RAM Configuration Screen

Shadow Configuration controls the shadowability of certain memory ranges.

If a certain memory range is used as ISA (PC/104) memory, shadowing should be disabled.

If Option ROMs need to be installed, it must be assured that a consecutive Shadow area big enough to hold the Option ROM is enabled.
Please refer to section 2.2 for more details about the memory map.

Shadow Region	Physical Address	Segment Address		
16KB ROM at D000	D0000h – D3FFFh	D000 – D3FF	Disabled	
			Enabled	default
16KB ROM at D400	D4000h – D7FFFh	D400 – D7FF	Disabled	
			Enabled	default
16KB ROM at D800	D8000h – DBFFFh	D800 – DBFF	Disabled	
			Enabled	default
16KB ROM at DC00	DC000h – DFFFFh	DC00 – DFFF	Disabled	
			Enabled	default

3.10 PLUG-N-PLAY CONFIGURATION

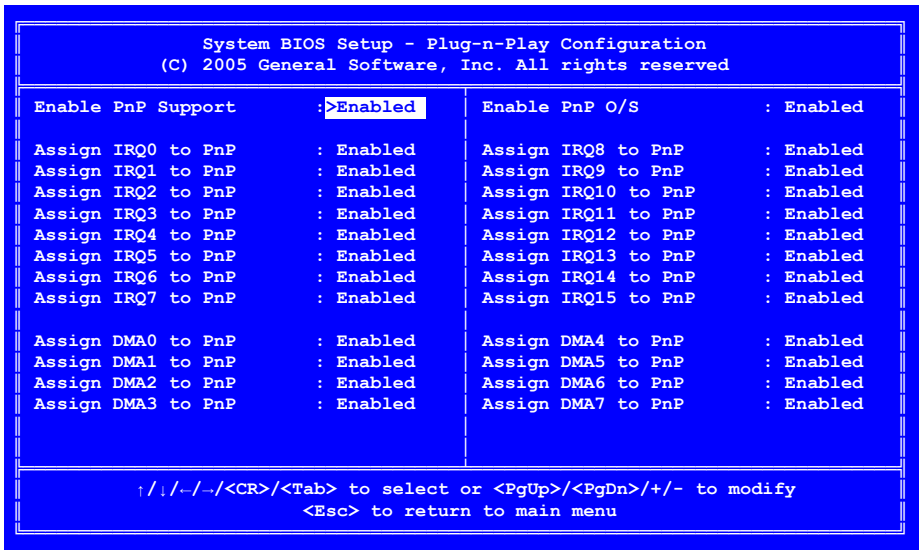
System BIOS Setup - Plug-n-Play Configuration
(C) 2005 General Software, Inc. All rights reserved
Enable PnP Support :>Enabled
Enable PnP O/S : Enabled
Assign IRQ0 to PnP : Enabled
Assign IRQ1 to PnP : Enabled
Assign IRQ2 to PnP : Enabled
Assign IRQ3 to PnP : Enabled
Assign IRQ4 to PnP : Enabled
Assign IRQ5 to PnP : Enabled
Assign IRQ6 to PnP : Enabled
Assign IRQ7 to PnP : Enabled
Assign IRQ8 to PnP : Enabled
Assign IRQ9 to PnP : Enabled
Assign IRQ10 to PnP : Enabled
Assign IRQ11 to PnP : Enabled
Assign IRQ12 to PnP : Enabled
Assign IRQ13 to PnP : Enabled
Assign IRQ14 to PnP : Enabled
Assign IRQ15 to PnP : Enabled
Assign DMA0 to PnP : Enabled
Assign DMA1 to PnP : Enabled
Assign DMA2 to PnP : Enabled
Assign DMA3 to PnP : Enabled
Assign DMA4 to PnP : Enabled
Assign DMA5 to PnP : Enabled
Assign DMA6 to PnP : Enabled
Assign DMA7 to PnP : Enabled
↑/↓/←/→/<CR>/<Tab> to select or <PgUp>/<PgDn>/+/- to modify
<Esc> to return to main menu

Figure 13: Plug-N-Play Configuration Screen

3.10.1 GENERAL PNP CONFIGURATION

Enable PnP Support	Enables / Disables Plug-N-Play support	
	Disabled	Plug-N-Play support is disabled
default	Enabled	Plug-N-Play support is enabled
Enable PnP O/S	Must be set according to the installed operating system (OS)	
	Disabled	Disable it if OS is not capable of PnP
default	Enabled	Enable it if OS is capable of PnP

3.10.2 PNP IRQ CONFIGURATION

Assign IRQx to PnP	Defines which IRQs are available for PnP devices	
IRQ0	Disabled	IRQ0 not available for PnP devices
	Enabled	IRQ0 available for PnP devices (default)
IRQ1	Disabled	IRQ1 not available for PnP devices
	Enabled	IRQ1 available for PnP devices (default)
IRQ2	Disabled	IRQ2 not available for PnP devices
	Enabled	IRQ2 available for PnP devices (default)
IRQ3	Disabled	IRQ3 not available for PnP devices
	Enabled	IRQ3 available for PnP devices (default)
IRQ4	Disabled	IRQ4 not available for PnP devices
	Enabled	IRQ4 available for PnP devices (default)
IRQ5	Disabled	IRQ5 not available for PnP devices
	Enabled	IRQ5 available for PnP devices (default)
IRQ6	Disabled	IRQ6 not available for PnP devices
	Enabled	IRQ6 available for PnP devices (default)
IRQ7	Disabled	IRQ7 not available for PnP devices
	Enabled	IRQ7 available for PnP devices (default)
IRQ8	Disabled	IRQ8 not available for PnP devices
	Enabled	IRQ8 available for PnP devices (default)
IRQ9	Disabled	IRQ9 not available for PnP devices
	Enabled	IRQ9 available for PnP devices (default)
IRQ10	Disabled	IRQ10 not available for PnP devices
	Enabled	IRQ10 available for PnP devices (default)
IRQ11	Disabled	IRQ11 not available for PnP devices
	Enabled	IRQ11 available for PnP devices (default)
IRQ12	Disabled	IRQ12 not available for PnP devices
	Enabled	IRQ12 available for PnP devices (default)
IRQ13	Disabled	IRQ13 not available for PnP devices
	Enabled	IRQ13 available for PnP devices (default)
IRQ14	Disabled	IRQ14 not available for PnP devices
	Enabled	IRQ14 available for PnP devices (default)
IRQ15	Disabled	IRQ15 not available for PnP devices
	Enabled	IRQ15 available for PnP devices (default)

3.10.3 PNP DMA CONFIGURATION

Assign DMAx to PnP	Defines which DMAs are available for PnP devices	
DMA0	Disabled	DMA0 not available for PnP devices
	Enabled	DMA0 available for PnP devices (default)
DMA1	Disabled	DMA1 not available for PnP devices
	Enabled	DMA1 available for PnP devices (default)
DMA2	Disabled	DMA2 not available for PnP devices
	Enabled	DMA2 available for PnP devices (default)
DMA3	Disabled	DMA3 not available for PnP devices
	Enabled	DMA3 available for PnP devices (default)
DMA4	Disabled	DMA4 not available for PnP devices
	Enabled	DMA4 available for PnP devices (default)
DMA5	Disabled	DMA5 not available for PnP devices
	Enabled	DMA5 available for PnP devices (default)
DMA6	Disabled	DMA6 not available for PnP devices
	Enabled	DMA6 available for PnP devices (default)
DMA7	Disabled	DMA7 not available for PnP devices
	Enabled	DMA7 available for PnP devices (default)

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4 NONVOLATILE BIOS SETUP

4.1 OVERVIEW

The PIP BIOS features the option to permanently save the BIOS settings into the Flash memory. This memory is nonvolatile, therefore the BIOS settings do not get lost if the battery is dead or removed. It is no longer necessary to manually reconfigure the BIOS in these cases.

If the BIOS detects that the settings are corrupt, it checks whether the Flash contains a valid image of the BIOS settings and if so, it loads the settings from the Flash. If there is no valid image in the Flash, it loads the factory default settings.

If the BIOS is updated, the Flash memory area holding the BIOS settings is erased as well. This prevents configuration errors if the new BIOS introduces additional BIOS settings or if it redefines existing settings.

To take full advantage of the nonvolatile BIOS setup feature, it is recommended to save the BIOS settings to the Flash once the BIOS is properly configured for your application.

NOTE

The date and time values are not saved in Flash.

4.2 USAGE

The feature is controlled by two options in the Main BIOS Setup Menu.

- Save CMOS to nonvolatile Flash
- Load CMOS from nonvolatile Flash

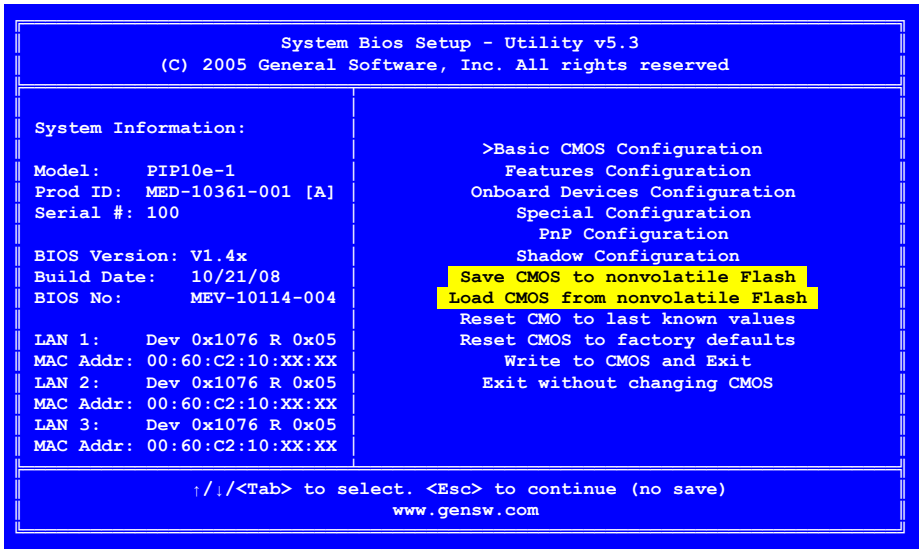

Figure 14: Main BIOS Setup Menu

4.2.1 SAVE CMOS TO NONVOLATILE FLASH

This writes the current BIOS settings to the Flash.
A dialog box pops up and asks for confirmation.

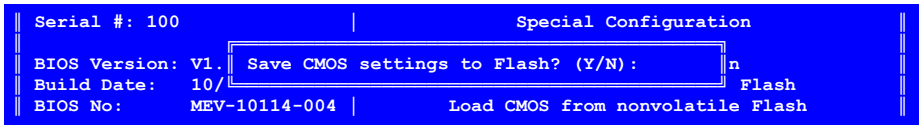

Figure 15: Save CMOS Dialog Box

Press 'Y' to save the BIOS settings in the Flash or 'N' to cancel and return to the main BIOS setup menu.

4.2.2 LOAD CMOS FROM NONVOLATILE FLASH

Use this to manually read the BIOS settings from the Flash.
A dialog box pops up and asks for confirmation.

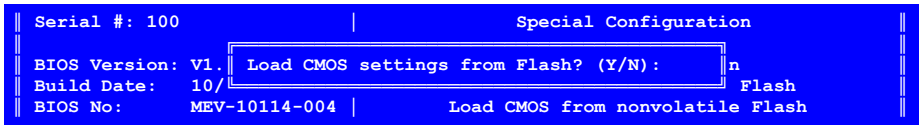

Figure 16: Load CMOS Dialog Box

Press 'Y' to load the BIOS settings from the Flash or 'N' to cancel and return to the main BIOS setup menu.

4.2.2.1 CMOS LOAD ERROR

If there is no valid image of the BIOS settings stored in the Flash (e.g. directly after a BIOS update), the following dialog box pops up, indicating that the BIOS settings have not been loaded from the Flash.

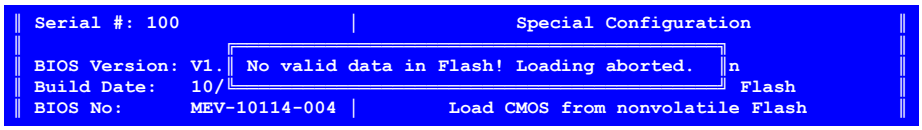

Figure 17: Load CMOS Error Dialog

In this case, press any key to return to the main BIOS setup menu.

5 USB BOOT

5.1 OVERVIEW

The PIP BIOS supports booting from USB mass storage devices, such as:

- CDROM drives
- Hard disk drives
- Memory Sticks
- Floppy disk drives

NOTE

If you experience problems with a certain USB device, please try a different model. There is a vast variety of USB devices available on the market, and some of them may prove incompatible with the USB host controller of the PIP.

5.2 BIOS SETTINGS

The following are the necessary steps to configure the system to boot from USB devices.

- Make sure that the options 'System Management Mode' and 'UsbMassStorage' are both enabled. These options are located in the Features Configuration menu.

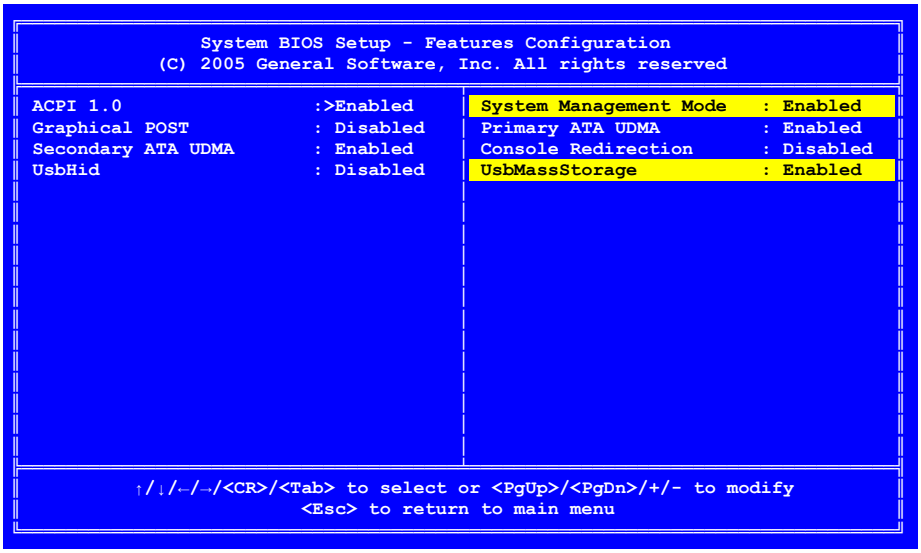
System BIOS Setup - Features Configuration
(C) 2005 General Software, Inc. All rights reserved
ACPI 1.0 :>Enabled
Graphical POST : Disabled
Secondary ATA UDMA : Enabled
UsbHid : Disabled
System Management Mode : Enabled
Primary ATA UDMA : Enabled
Console Redirection : Disabled
UsbMassStorage : Enabled
↑/↓/←/→/<CR>/<Tab> to select or <PgUp>/<PgDn>/+/- to modify
<Esc> to return to main menu

Figure 18: Features Configuration for USB Boot

- Configure the USB drive in the Basic CMOS Configuration menu.

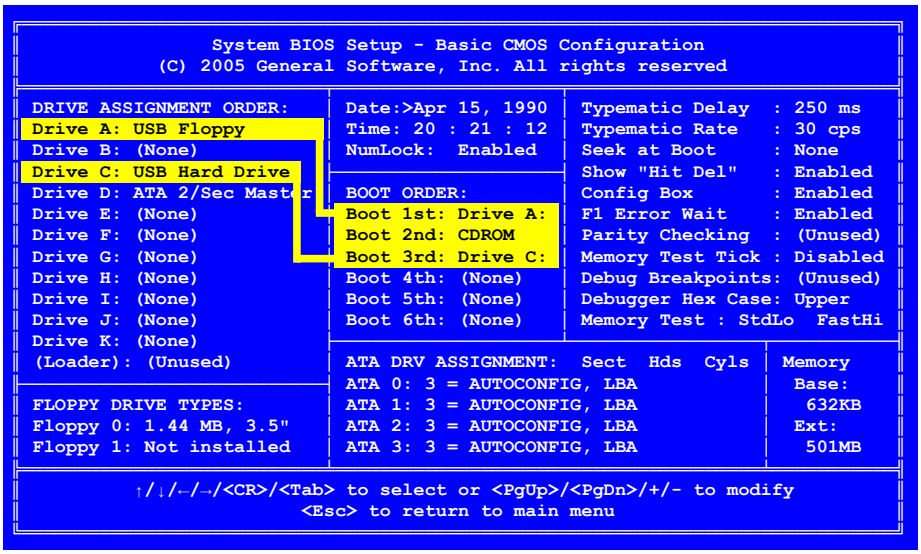

Figure 19: Basic CMOS Configuration for USB Boot

- **To boot from a USB CDROM drive:**
  - Select 'CDROM' in the 'Boot Order' menu. 'Drive Assignment Order' does not have to be configured.

  In the above example screen, the system is configured to boot from USB CDROM as second boot source.

- **To boot from a USB Hard Disk drive (e.g. memory stick, external hard disk drive):**
  - Configure one of drives C: thru K: as 'USD Hard Drive' in the 'Drive Assignment Order' menu.
  - Make sure that in the 'Boot Order' menu, the respective drive is selected as well.

  In the above example screen, the system is configured to boot from USB Hard Disk drive as third boot source.

- **To boot from a USB Floppy:**
  - Configure one of drives A: thru B: as 'USB Floppy' in the 'Drive Assignment Order' menu.
  - Make sure that in the 'Boot Order' menu, the respective drive is selected as well.

  In the above example screen, the system is configured to boot from USB Floppy drive A: first.

6 NETWORK BOOT (PXE)

The PIP BIOS supports booting from one of the onboard Ethernet controllers using the PXE protocol. Please refer to section 3.8.2 for details about selecting the Ethernet controller.
The following message indicates PXE being initialized:

```
Initializing Intel(R) Boot Agent GE v1.2.70
PXE 2.1 Build 086 (WfM 2.0)
Press Ctrl+S to enter the Setup Menu...
```

Figure 20: PXE Boot Message

6.1 PXE CONFIGURATION

The PXE configuration menu is entered by pressing CTRL+S when indicated by the PXE initialization message displayed above.
The following table shows the configuration options.

Network Boot Protocol		
default	PXE (Preboot eXecution Environment)	Use PXE as boot protocol
Boot Order		
	Try network first, then local drives	If no boot source is found on the network, the standard BIOS boot order (refer to section 3.5.3) is executed. Otherwise, the system boots from network.
default	Try local drives first, then network	If the BIOS boot order (refer to section 3.5.3) does not contain a bootable device, the network boot is executed. Otherwise, the system boots from a bootable local drive.
	Try network only	The system boots from network only. The BIOS boot order (refer to section 3.5.3) is skipped.
	Try local drives only	The system boots from local drives as configured in the BIOS boot order (refer to section 3.5.3) only. Network boot is skipped.
Show Setup Prompt		
	Disabled	Do not show 'Press Ctrl+S to enter the Setup Menu...'
default	Enabled	Show 'Press Ctrl+S to enter the Setup Menu...'
Setup Menu Wait Time		
	0	Waits 0 sec for Ctrl+S
default	2	Waits 2 sec for Ctrl+S
	3	Waits 3 sec for Ctrl+S
	5	Waits 5 sec for Ctrl+S

6.2 CHANGING THE CONFIGURATION

<ESC> Leave Setup Menu and lose changes.
<SPACE> Change value.
<ENTER> Jump to next option.
<F4> Save changes and leave Setup menu.

NOTE: Each one of the onboard Ethernet controllers has its own configuration.

6.3 BOOTING FROM NETWORK

Setting up a server that provides bootable images for network clients is a complex task which is beyond the scope of this manual. The PIP merely makes available the feature of booting from a correctly configured boot server.
Please visit the Intel website at http://support.intel.com/support/network/adapter/pro100/bootagent/index.htm for further information.

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